

CLAIMS

I CLAIM

1. A ceramic thermal barrier coating wherein at least a portion of the coating comprises a stabilized zirconia coating including hafnia in an amount effective to reduce thermal conductivity of the thermal barrier coating as compared to a similar coating having an impurity amount of hafnia.
2. The coating of claim 1 wherein hafnia is present in an amount of at least about 15 weight % of the coating.
3. The coating of claim 2 comprising about 15.8 to about 63.4 weight % hafnia, about 2.0 to about 36.6 weight % yttria, and balance zirconia.
4. The coating of claim 3 comprising about 34.3 to about 61.6 weight % hafnia, about 5.3 to about 11.8 weight % yttria, and balance zirconia.
5. The coating of claim 4 comprising about 58.1 to about 59.7 weight % hafnia, about 5.3 to about 8 weight % yttria, and about 34 to about 35 weight % zirconia.
6. The coating of claim 5 that exhibits thermal conductivity of less than 1.5 W/m-K.
7. An article comprising a metallic substrate and a ceramic coating on a surface of said substrate, said coating having at least a portion comprising a stabilized zirconia coating including hafnia in an amount effective to reduce thermal conductivity of the thermal barrier coating as compared to a similar coating having an impurity amount of hafnia.
8. The article of claim 7 wherein hafnia is present in the coating in an amount of at least about 15 weight % to about 64 weight % of the coating.

9. The article of claim 8 wherein the coating comprises about 15.8 to about 63.4 weight % hafnia, about 2.0 to about 36.6 weight % yttria, and balance zirconia.

10. The article of claim 9 wherein the coating comprises about 34.3 to about 61.6 weight % hafnia, about 5.3 to about 11.8 weight % yttria, and balance zirconia.

11. The article of claim 10 wherein the coating comprises about 58.1 to about 59.7 weight % hafnia, about 5.3 to about 8 weight % yttria, and about 34 to about 35 weight % zirconia.

12. The article of claim 11 wherein the coating exhibits a thermal conductivity of less than 1.5 W/m-K.

13. The article of claim 7 wherein said substrate comprises a superalloy gas turbine engine blade or vane.

14. The article of claim 7 further including a bondcoat between said coating and said substrate.

15. A method of protecting a surface of a metallic substrate, comprising:

depositing a coating comprising zirconia, yttria and hafnia wherein the hafnia is present in the coating in an amount effective to reduce thermal conductivity of the coating deposited on the substrate as compared to a similar coating having an impurity amount of hafnia.

16. The method of claim 15 wherein hafnia is present in the coating in an amount of at least about 15 weight % to about 64 weight % of the coating.

17. The method of claim 16 wherein the coating comprises about 15.8 to about 63.4 weight % hafnia, about 2.0 to about 36.6 weight % yttria, and balance zirconia.

18. The method of claim 17 wherein the coating comprises about 34.3 to about 61.6 weight % hafnia, about 5.3 to about 11.8 weight % yttria, and balance zirconia.

19. The article of claim 18 wherein the coating comprises about 58.1 to about 59.7 weight % hafnia, about 5.3 to about 8 weight % yttria, and about 34 to about 35 weight % zirconia.